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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,536	10/13/2005	Frederik Petrus Venter	12857/3	9807

7590 03/16/2007	EXAMINER
Brinks Hofer Gilson & Lione PO Box 10438 Chicago, IL 60611-5599	DUNLAP, JONATHAN M

ART UNIT	PAPER NUMBER
2855	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

	Office Action Summary	Application No. 10/536,536	Applicant(s) VENTER ET AL.
		Examiner Jonathan Dunlap	Art Unit 2855

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>26 May 2005</u>.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☒ Claim(s) *1 and 8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>May 26, 2005</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

       1.☒ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____.

       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date <u>May 26, 2005</u>.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which

papers have been placed of record in the file.

Specification

The disclosure is objected to because of the following informalities: formula **54**

does not appear to present an accurate determination of a displacement. The units of

the coefficients of each of the displacement values (Y_1, Y_0 and MV) are not unity, and

therefore cannot result in the sum of a displacement Y.

Appropriate correction is required.

Claim Objections

Claim 1 is objected to because of the following informalities: "displacing the first

and second parts of the sock absorber" should be rewritten as "displacing the first and

second parts of the shock absorber". Appropriate correction is required.

Claim 8 is objected to because the method Nelder Mead" should be rewritten as

"Nelder Mead". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 4-11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. **Claims 5-11** inherit the deficiencies of **claim 4** and are, therefore, also rejected.

The basis for the rejection of **claim 4** is as follows.

On page 9 of the specification submitted on May 26, 2005, Applicant states "a curve fitting algorithm iteratively adjusts the values for P, K and t until the series of Y values approximate the series of measured displacement values within tolerable limits." However, on Page 8 of the same submission, Applicant states "incidental acceleration values of the vehicle body 16 on the suspension are recorded at discrete time intervals." Therefore, no measured value of displacement ever occurs.

Furthermore, formulas 54 and 60, in combination, do not enable one of ordinary skill in the art to model either acceleration or displacement values. The formula 54 does not produce a displacement because the units of the coefficients of each of the displacement values (Y_1, Y_0 and MV) are not unity, and therefore cannot result in the sum of a displacement Y. Formula 60 is a continuous derivative while formula 54 is a

discrete recursive equation. One of ordinary skill in the art of measuring damping

constants would not be enabled to determine the acceleration based on the recursive

formula 54 as provided.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1.   **Claims 1-2, 12-14 and 16** are rejected under 35 U.S.C. 102(b) as being

anticipated by **Honda (U.S. Patent 5,648,902)**.

Considering **claim 1**, discloses a method of determining a damping factor of a

shock absorber, the method comprising:

- Attaching an accelerometer **5** to one of a first **2** and a second part of the

shock absorber **3** (**Figure 2; Column 2, lines 56-59**);

- Displacing the first **2** and second parts of the sock absorber **3** relative to

one another at least once (**Column 2, lines 47-52**);

- Measuring an acceleration of the first **2** and second parts of the shock

absorber **3** relative to each other by reading a signal from the

accelerometer **5** (**Column 3, lines 15-19**); and

- Determining the damping factor of the shock absorber **3** by analysis of

the measured acceleration (**Column 3, lines 15-26; Column 4, lines 2-

11**).

Considering **claim 2**, discloses attaching the accelerometer **5** to a vehicle body **2**

proximate one of the wheels **11** of the vehicle body **2** and which is fast with one of the

first part **2** and the second part of the shock absorber **3** (**Figure 2; Column 2, lines 56-65**).

Considering **claim 12**, discloses a shock absorber monitoring system, the system comprising:

- An accelerometer **5** to generate an acceleration signal, the accelerometer **5** being removably attachable to one of a first part **2** and a second part of a shock absorber **3** (**Figure 2; Column 2, lines 33-47**);

- A processor **7,8,9** connected to the accelerometer **5**, a processor **7,8,9** being operable to read the acceleration signal from the accelerometer **5** and to calculate a damping factor of the shock absorber **3** when the first **2** and second parts of the shock absorber **3** are displaced relative to one another (**Figures 3-5; Column 3, lines 10-26; Processor further operates program outlined in Figures 4-5**); and

- An indicator **13a** responsive to the processor, operable to display a value representative of the damping factor of the shock absorber **3** (**Figure 3; Column 4, lines 7-11**).

Considering **claim 13**, discloses a storage device in which a set of instructions are stored, which instructions, when executed by the processor, direct the processor to perform a set of mathematical calculations (**Figure 4; Column 3, lines 28-43; It would be required to have a storage device to stored the executed program**).

Considering **claim 14**, discloses that the accelerometer **5** is remote from the processor **7,8,9** (**Figure 2**).

Considering **claim 16**, discloses a communication port **14a** connected to the

processor **7,8,9**, operable to send and receive data to and from a remote device, such

as a personal computer **13** (**Figure 2; Column 2, lines 66-67; Column 3, lines 1-26**).

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Honda**

(**U.S. Patent 5,648,902**) in view of **Michler (U.S. Patent 5,983,168**).

The invention by Honda fails to disclose that the signal from the accelerometer is

read over a period of time at discrete intervals, to generate a series of measured

acceleration values.

4.   However, Michler teaches that the signal from the accelerometer **44** is read over

a period of time at discrete intervals, to generate a series of measured acceleration

values (**Figure 3; Column 4, lines 1-6, 12-23**).

Therefore, it would have been obvious to one of ordinary skill in the art at the

time of the invention to, as opposed to real-time monitoring, use discrete time interval

measurements as taught by Michler in the invention by Honda. The motivation for doing

so is to create state space control command signals for position and velocity based on

the acceleration information provided from the accelerometer to actively damp a

vibrating mass system (**Michler, Column 4, lines 12-53**).

5.   **Claims 4-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over

Honda (U.S. Patent 5,648,902) in view of **Michler (U.S. Patent 5,983,168)** and further

in view of **Langlechner (U.S. Patent 6,161,419)**.

The invention by Honda, as modified by Michler, fails to disclose that determining

the damping factor of the shock absorber comprises modeling movement properties of

the shock absorber mathematically with a differential equation to generate a series of

theoretical acceleration values and mathematically fitting the series of theoretical

acceleration values to the series of measured acceleration values, that the differential

equation is of the second order, that the mathematical fitting of the series of theoretical

acceleration values to the series of measured acceleration values is performed

iteratively, and that the iterative fitting of the series of theoretical acceleration values to

the series of measured acceleration values is repeated until a predefined correlation

between the series of theoretical and measured acceleration values is obtained.

6.   However, Langlechner teaches

Considering **claim 4**, that determining the damping factor d_2 of the shock

absorber comprises modeling movement properties of the shock absorber

mathematically with a differential equation **1,2 or 3** to generate a series of theoretical

acceleration values and mathematically fitting the series of theoretical acceleration

values to the series of measured acceleration values (**Figure 2; Column 2, lines 21-25,**

lines 43-46; Column 3, lines 34-44; Column 4, lines 9-67; Column 5, lines 1-15, 46-67; Column 6, lines 1-16, lines 39-49).

Considering **claim 5**, that the differential equation **1,2 or 3** is of the second order **Column 4, lines 33-37, 66**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a second order differential equation to model the movement properties of a shock absorber and to mathematically fit the series of modeled acceleration values to the measured acceleration values as taught by Langlechner in the invention by Honda, as modified by Michler. The motivation for doing so is found in the teachings of Langlechner, "the process [is] suitable for: series-testing e.g. by regulatory authorities, and by the automobile industry...and workshop diagnosis of fault in motor vehicles already in service, because the process of the invention enables the vehicle's actual values to be compared with the required values" (**Column 2, lines 3-12**). Furthermore, it is well known in the art the model for a spring-mass-damper system is a second-order differential equation.

Considering **claim 6**, that the mathematical fitting of the series of theoretical acceleration values to the series of measured acceleration values is performed iteratively (**Column 5, lines 50-55**).

Considering **claim 7**, that the iterative fitting of the series of theoretical acceleration values to the series of measured acceleration values is repeated until a

predefined correlation between the series of theoretical and measured acceleration

values is obtained (**Column 5, lines 50-55**).

Therefore, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to utilize an iterative fitting of measured acceleration

values to modeled acceleration values and to repeat the process until a predefined

correlation between the values exists as taught by Langlechner in the invention by

Honda, as modified by Michler. The motivation for doing so is to determine the damping

constant as taught by Langlechner (**Column 5, lines 50-55**). The motivation for

repeating the process is also taught by Langlechner in that the least-squares method is

an iterative process in optimization. Langlechner teaches that the process of

optimization comes to an end. It is obvious that there was a predefined correlation that

stops the process of iterations (**Figure 4; Column 5, lines 50-61**).

7.   **Claims 8-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over

Honda (U.S. Patent 5,648,902) in view of **Michler (U.S. Patent 5,983,168)** and further

in view of **Langlechner (U.S. Patent 6,161,419)** and furthermore in view of **Etman**

(NPL - Optimization of Multibody Systems using Approximation Concepts).

The invention by Honda as modified by Michler and further modified by

Langlechner, considering **claim 8**, fails to disclose that the mathematical fitting of the

series of theoretical acceleration values to the series of measured acceleration values

employs a "Nelder Mead" algorithm.

However, Etman teaches that the mathematical fitting of the series of theoretical acceleration values to the series of measured acceleration values employs a "Nelder Mead" algorithm (**Pages 14-17, 91 and 98**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a Nelder Mead algorithm as a mathematical fitting of the theoretical acceleration values to the series of measured acceleration values as taught by Etman in the invention by Honda, as modified by Michler and further modified by Langlechner. Etman teaches a iterative optimization method for spring-mass-damper designing for determining a damping coefficient and further acknowledges that it is known in the art that a Nelder Mead algorithm has been used to optimize the parameters of elasto-damping elements of a vehicle model. The motivation for using the Nelder Mead alrogirthm is found in the teaching of Etman, "the Nelder and Mead simplex algorithm...is rather robust for discontinuities since it does not use gradients" (**Page 91**).

Considering **claim 9**, Langlechner teaches that a damping constant from the fitted series of theoretical acceleration values is generated from the mathematical model to approximate the damping factor of the shock absorber with the damping constant generated from the mathematical model, and to compare the approximated damping factor of the shock absorber with qualitative data from a manufacturer of the shock absorber (**Column 2, lines 2-12; Column 5, lines 46-67; Column 6, lines 1-10**).

Therefore, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to formulate a damping constant from a series of fitted

theoretical acceleration values to approximate the actual damping factor as compared

with the damping constant obtained from the theoretical model and to compare the

approximated damping factor with manufacture required limits as previously taught by

Langlechner in the invention by Honda, as modified by Michler, now furthermore

modified by Etman. The motivation for doing so is found in the teaching of Langlechner,

for "workshop diagnosis of faults in motor vehicles already in service." **(Column 2, lines

9-10)**.

8.   **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Honda

(U.S. Patent 5,648,902)** in view of **Michler (U.S. Patent 5,983,168)** and further in view

of **Langlechner (U.S. Patent 6,161,419)** and furthermore in view of **Etman (NPL -

Optimization of Multibody Systems using Approximation Concepts)** and

furthermore in view of **Bollinger (U.S. Patent RE 29,434)**.

The invention by Honda as modified by Michler and further modified by

Langlechner and furthermore modified by Etman, fails to disclose that an alarm is

generated when the approximated damping factor falls outside tolerable limits of the

qualitative data.

9.   However, Bollinger teaches that an alarm is generated when the approximated

damping factor falls outside tolerable limits of the qualitative data **(Column 2, lines 45-

51)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to include an alarm for indicating that the damping factor

falls outside of the manufacture tolerable limits as taught by Bollinger in the invention by

Honda, as modified by Michler and furthermore modified by Langlechner and Etman.

The motivation for doing so is to ensure that the deficiency of the shock absorber is not

left unnoticed and it provides a visual indication of the overall condition of the shock

absorber.

10.   **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Honda**

(U.S. Patent 5,648,902) in view of **Michler (U.S. Patent 5,983,168)** and further in view

of **Langlechner (U.S. Patent 6,161,419)** and furthermore in view of **Etman (NPL -**

Optimization of Multibody Systems using Approximation Concepts) and

furthermore in view of **Needleman et al. (U.S. Patent 4,979,388)**

The invention by Honda as modified by Michler and further modified by

Langlechner and furthermore modified by Etman, fails to disclose that the method is

repeated a plurality of times, the obtained damping factors are stored, and an average

is calculated of the stored damping factors.

11.   However, Needleman teaches that the method is repeated a plurality of times,

the obtained damping factors are stored, and an average is calculated of the stored

damping factors (**Column 2, lines 43-49, 64-68; Column 3, lines 1-6**).

Therefore it would have been obvious to one of ordinary skill in the art at the time

the invention was made to repeat the tests a plurality of times and stored damping

factors as taught by Needleman in the invention by Honda, as modified by Michler and

furthermore modified by Langlechner and Etman. The motivation for doing so is that "if

a measurement has apparently been carried out improperly due to lack of human

attention, a key can be pressed to clear the measurement just carried out so it can be

repeated correctly. The other measurements remain in memory" (**Column 2, lines 64-**

68; Column 3, lines 1-4). Furthermore, it would have been obvious to one skilled in the

art to average a set of stored and or printed values to improve the accuracy of the

approximated values that were previously stored.

12.   **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Honda**

(U.S. Patent 5,648,902) in view of **Kleynhans (ZA-A-94 06337)**.

The invention by Honda fails to disclose that the accelerometer includes radio

frequency transmitter and the processor includes a radio frequency receiver responsive

to the transmitter, operable to receive the acceleration signal via a radio frequency

signal.

13.   However, Kleynhans teaches that the accelerometer includes radio frequency

transmitter **44** and the processor **14** includes a radio frequency receiver **32** responsive

to the transmitter **44**, operable to receive the acceleration signal via a radio frequency

signal (**Figure 6; Page 11, lines 11-25**).

Therefore, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to include a wireless transmission line as taught by in the

invention by Honda. The motivation for doing so is found in the teachings of Kleynhans,

"transmitting the data, or data derived therefrom, to remote data processing means by means of a wireless data communication link" **(Page 2, lines 11-12)**. Kelynhans invention requires that a wireless data communication link be established to transfer data from the unit attached to the vehicle to a remote processing unit.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. McKenney et al. (**'659**), Buzzi (**'532**), Stuyts (**'024**) and Ilzig et al. (**'901**) all disclose frequency domain methods of testing shock absorbers. Oberheide et al. (**'221**) discloses a system for evaluating the condition of shock absorbers. Stevens et al. (**'387**) discloses a system for evaluating the condition of shock absorbers using a rotary encoder. Shechet et al. (**'731**) discloses a system for evaluating shock absorbers based on a baseline.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Dunlap whose telephone number is (571) 270-1335. The examiner can normally be reached on M-F 8-5 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jonathan Dunlap
Examiner
AU 2855
March 15, 2007

EDWARD LEFKOWITZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800